Although lithium itself is one of the most important elements in current renewable energy technology, mining it will cause side effects on the environment. Current technology asks the engineers to extract lithium from rare earth and heavy metals, which may emit large amounts of toxic chemical by-products. Even if Australia follows the traditional way to extract lithium from rocks, it still requires the use of chemicals to extract it in a useful form. Plus, mining lithium needs lots of water. “More than half of global lithium reserves are within what is referred to as the ‘Lithium Triangle’”,1 which is water intensive. During extraction, two million liters of water can only create one ton of lithium. According to the data in Statista.com, only Australia has produced 208 tons of lithium in 2020. The rising demand for lithium extraction leads to concern on water shortage in agricultural use. Following issue from the extraction process is how to deal with the water used in it. The disposal of industrial water will make a threat on local water supplies, which may even worse result in social unrest. According to research, “large evaporation pools, which generally sit for over a year, can leak toxic chemicals and contaminate bodies of water.”2 Besides mining, the products from lithium like lithium batteries also affect the environment. The main issue for batteries is its low recycling rate. “In Australia, only two percent of the country’s 3,300 metric tons of lithium-ion waste is recycled.”1 It is common to see unwanted laptops end up in landfills, which may leak “metals from the electrodes and ionic fluids from the electrolyte”.2 One of the reasons for low recycling is that manufacturers of batteries are secretive about their products. The current technology to recycle is to shred the batteries and burn the mixture of mental for decompose. However, this will waste lots of lithium, leading to energy and financial costs. Moreover, the market for recycling lithium is quite unimpressive in Australia. Although the total recycling market rises quickly, the proportion for lithium is much lower than nickel and cobalt. These issues ask engineers to find a way that leaves a small footprint and low energy consumption. Direct Lithium Extraction (DLE) technology is a good choice for sustainable lithium extraction. This will extract lithium in geothermal water and selectively removing compounds from the water, so that it can reduce the carbon footprint and water waste.3 Plus, engineers should find the way to reuse the wasted batteries. For example, China planned to put repurposed batteries as backup power systems for China’s 5G stations or reused in shared e-bikes, which save 63 million tons of carbon emissions.3

1. <https://www.mining.com/lithium-extraction-techniques-increasingly-under-esg-scrutiny-fitch-report/>
2. https://www.instituteforenergyresearch.org/renewable/the-environmental-impact-of-lithium-batteries/
3. https://www.instituteforenergyresearch.org/renewable/the-environmental-impact-of-lithium-batteries/